

Features of Posttraumatic Distress Among Adolescent Athletes

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Objective: To examine features of posttraumatic distress related to sport injury among healthy and injured adolescent athletes.

Design and Setting: Healthy athletes with and without a prior injury history were screened before their competitive season, and injured and matched control athletes were surveyed at 1 week postinjury.

Subjects: We screened 283 athletes during the preseason and categorized them by injury history ($n = 43$) and no injury history ($n = 240$) groups. Twenty-four athletes (12 injured, 12 matched uninjured controls) were included in the postinjury analysis.

Measurements: The Impact of Events Scale, a 15-item self-report questionnaire, was used to measure athletes' frequency

of experiencing intrusive thoughts and engaging in avoidance behavior regarding athletic injury.

Results: Athletes with a recent injury history exhibited a greater frequency of intrusive thoughts and avoidance behavior than did those without a recent injury history. Although postinjury findings did not reach statistical significance, injured athletes' scores increased by 35% to 49% from preinjury to postinjury, whereas only minimal changes ($<1\%$) occurred in the control group.

Conclusions: Younger athletes may be particularly sensitive to injury-related stimuli, which may result in heightened injury-related distress.

Key Words: intrusive thought, avoidance behavior, sport psychology

Common features of posttraumatic distress accompany athletic injury in samples from adult athlete populations,^{1–3} and levels of posttraumatic distress are similar to those in other medical populations after physical trauma (ie, motor vehicle accidents).⁴ However, little is known regarding the responses of children and adolescent athletes to sport injury. The general medical literature suggests that they are at greater risk than adults for psychological distress after a traumatic event, and the severity of the event does not seem to predict subsequent psychological disturbance.^{5–7} Moreover, in comparison with adults, children and adolescents tend to exhibit symptom variations such as disruptive behavior.^{6,8,9} Our purpose was to examine the presence of intrusive thoughts and avoidance behavior, 2 common features of posttraumatic distress, among injured and uninjured adolescents.

METHODS

We targeted specific sport teams at the onset of their competitive season on the basis of a relatively high risk of injury present in certain sports and in an attempt to obtain a sex-balanced sample. After receiving approval from our institutional review board (which also approved the study) and superintendent of schools, we obtained informed consent (and assent for minors) from participants (and parents for minors) during preseason team meetings. All participants had received medical clearance for sport participation and were deemed completely able to compete by their primary care physician

and their school's athletic trainer. Student-athletes who had not received medical clearance or were physically injured at the start of preseason were ineligible for the study. During the season, if an athlete sustained an injury that met the National Collegiate Athletic Association criterion for a severe injury (out for ≥ 7 days), the injured athlete was matched with an uninjured control athlete selected from a pool of healthy athletes after stratification for sport, sex, age, and starting status. The injured and control athletes completed the same survey administered during the preseason at 1 week postinjury.

In order to examine injury-related psychological distress, we conducted 2 separate analyses: (1) a comparison of injury-related distress among healthy athletes with and without a recent injury history and (2) preinjury to postinjury changes in injury-related distress among injured and uninjured control athletes.

A total of 283 adolescents (140 girls, 143 boys), representing 4 varsity sports (football, girls' soccer, basketball, and volleyball), were enrolled in the study. Participants ranged in age from 13 to 18 years (mean = 16.7 years, SEM = 0.079 years) and were predominantly white ($n = 240$).

For the first analysis, participants were classified according to whether they had experienced an injury within the past 12 months. Injury-history status was determined by the athlete's self-report ("Have you experienced a loss of playing time due to injury?") on a modified version of the Adolescent Perceived Events Scale (APES).¹⁰ Athletic trainers validated participants' self-reported injury histories by reviewing medical rec-

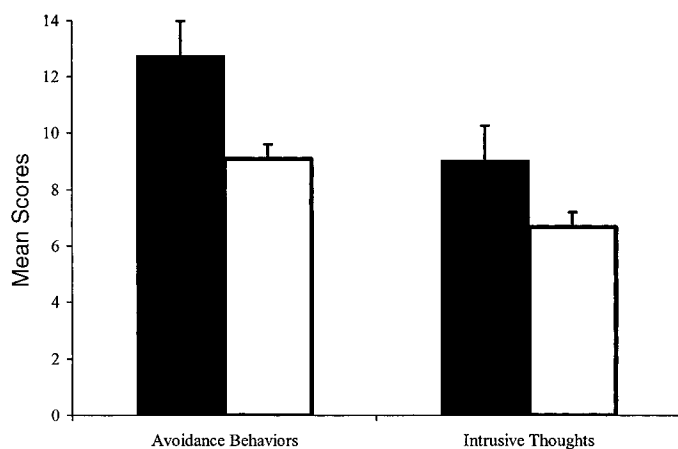


Figure 1. Mean Impact of Events Scale scores among healthy adolescent athletes. The main effect for injury was significant, $F_{2,280} = 3.09$, $P < .05$. The dark block represents the injury history group; the light block represents the no injury history controls.

ords, and athletes were classified into injury history ($n = 43$) and no injury history ($n = 240$) groups. Twenty-four athletes (12 injured, 12 controls) were included in the postinjury analysis. However, 2 of the control group participants were subsequently injured and dropped from the analysis.

We measured the frequency of intrusive thought and avoidance behavior with the Impact of Events Scale (IES).¹¹ The IES is a highly reliable, 15-item self-report instrument designed to assess intrusive thoughts and avoidance behavior (subscales), and it has been used with a wide variety of clinical populations.^{4,12,13} The intrusion subscale measures unbidden thoughts and images (eg, “images of it popped in my head”), whereas the avoidance subscale measures emotional numbing and attempts to avoid reminders of the event (eg, “I tried to stay away from reminders of it”). We asked respondents to consider their most recent serious athletic injury and report the degree (0 = not at all, 1 = rarely, 3 = sometimes, 5 = often) to which they experienced intrusive thoughts and engaged in avoidance behavior within the past 2 weeks. When we asked each participant to consider his or her injury history, we assumed that all athletes experience physical injury of various severities (ie, muscle soreness to torn ligaments) regardless of whether injury severity warranted medical attention. In fact, the IES is intended to evaluate the impact of an injury that the athlete, not the medical staff, considers significant.

RESULTS

Using a multivariate analysis of variance to correct for an unbalanced design across injury groups, we found a significant main group effect on both dependent measures, intrusive thoughts and avoidance behaviors ($F_{2,280} = 3.09$, $P < .05$) (Figure 1). Specifically, athletes with a recent injury history exhibited a greater frequency of intrusive thoughts (mean = 9.03 instances, $SD = 6.64$) and avoidance behaviors (mean = 12.75 instances, $SD = 8.99$) than those without a recent injury history (means = 6.67 and 9.08 instances, $SDs = 7.56$ and 8.58, respectively). These findings suggest that IES scores remain elevated for some time after the injury and may persist even after physical recovery has occurred, which is consistent with reports on other medical populations.^{14–17}

We conducted a repeated-measures multivariate analysis of

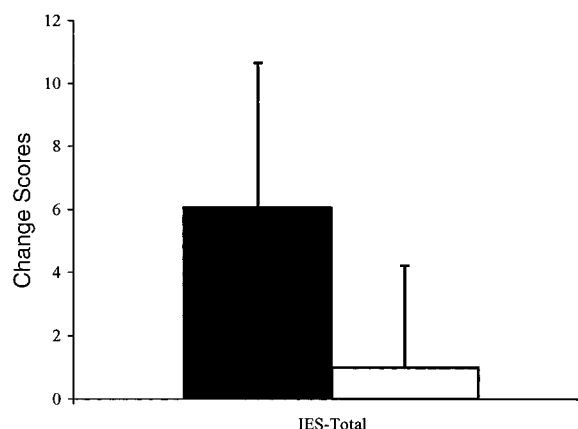


Figure 2. Change in Impact of Events Scale total scores from baseline to 1 week postinjury. Baseline scores were 15 for the injured group and 23.6 for the uninjured controls. The dark block represents the injured group; the light block represents the uninjured controls.

variance to compare changes in posttraumatic distress from baseline with postinjury distress among injured and uninjured matched control athletes. Injured athletes' IES scores increased by 35% to 49% from preinjury to postinjury, whereas only minimal changes ($<1\%$) occurred in the control group (Figure 2). However, due to sample-size limitations, no significant main effect was found ($P > .05$).

DISCUSSION

Psychometric evaluations of the APES scores yield acceptable concurrent validity and 2-week test-retest reliability ($r \geq 0.90$),¹⁰ and the sport-specific scale of the modified APES has demonstrated predictive validity for time loss due to injury among high and low sensation-seeking adolescent athletes ($r = 0.35$, $P < .01$).¹⁸ Psychometric evaluations of the IES scores yield acceptable levels of internal consistency and 2-week test-retest reliability of 0.78 to 0.82 and 0.79 to 0.89 for the intrusive thoughts and avoidance behaviors subscales, respectively.¹⁹ In our sample, IES internal consistency for both intrusion and avoidance subscales was quite high ($\alpha = 0.82$ and 0.81, respectively). Validation studies of the IES with children and adolescents demonstrated a factor structure (2-factor structure: intrusion and avoidance subscales) similar to that achieved in adult samples.²⁰

Our findings suggest that adolescent athletes experience injury-related distress despite having physically recovered from their injuries, and this is similar to findings with adult athletes^{1–3} and other medical populations.^{14–17} Moreover, IES total scores were rather high for both the injured and control athlete groups at screening and at 1 week follow-up time points (means ranged from 15 to 23.9). In fact, an IES total score of 16 is considered clinically relevant,¹¹ which indicates that the present sample of adolescents was thinking about injury regardless of their current injury status. These elevated scores, in addition to the small sample size, may have limited the ability to detect significant between-group changes. Variability in injury severity and days missed due to injury may have also limited results. However, the postinjury study was very well controlled through use of matched healthy controls, thus enhancing internal validity.

CONCLUSIONS

Our data are consistent with general findings that suggest adolescents may be at increased risk for developing psychological distress, particularly posttraumatic distress, after a traumatic event.⁵⁻⁷ Children and adolescents seem to exhibit exaggerated sensitivity as compared with adults.^{6,9,21} Traumatic events during childhood and adolescence may hinder opportunities for developmental maturation or establish maladaptive coping responses (eg, avoidance) that may, in turn, complicate future efforts at adjustment.²² However, our findings demonstrating elevated injury-related distress among adolescents regardless of injury status raise important considerations regarding posttraumatic distress and environmental cues.

The trauma literature has demonstrated an increased sensitivity to environmental cues among individuals exhibiting posttraumatic distress.^{23,24} In other words, individuals experiencing trauma-related distress report heightened reactivity and exaggerated distress when exposed to environmental cues indicative of their trauma. With regard to sport injury, younger athletes may be particularly sensitive to injury-related stimuli, which may result in heightened injury-related distress, as seen in the present sample. For example, healthy adolescents who had sustained a prior injury appeared to be emotionally reactive upon their return to sport at the preseason, and all adolescents appeared to remain reactive throughout the competitive season.

In addition to age-related vulnerability, social and environmental influences characteristic of competitive sport may also contribute to adolescents' heightened sensitivity. The culture of sport reinforces athletes to minimize injury-related pain, fear, and self-doubts.²⁵⁻²⁷ Among other medical populations, avoidance of trauma-related distress has been associated with prolonged negative affect, which, in turn, has been linked to delayed recovery.^{16,28-31} Adverse health outcomes associated with posttraumatic distress (eg, musculoskeletal healing and physical recovery) have not yet been examined in adolescent samples, but considering the present findings and those in adult athletes, the role of injury-related posttraumatic distress may be particularly important for young athletes.

Future research efforts should be directed toward the validation of the current findings with a larger sample of adolescent athletes. In addition, direct comparisons of injury-related psychological distress between adolescent and adult athletes may further our understanding of the adolescent injury experience. As sport-injury research among adolescents proliferates, it will also be useful to examine patient outcomes (ie, treatment compliance and satisfaction) and evaluate interventions aimed at minimizing postinjury distress (ie, stress management training) seen currently among injured adults.³²⁻³⁶

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